SUBJECT: Wheelabrator Saugus Inc. Flow Management Study 2012

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DISTRIBUTION:

Eric Lucier	Saugus Plant Manager
Matt Hughes	Senior Environmental Manager
Jim Connolly	Senior Permitting Manager
Roger Andover	Director, Engineering
Jairaj Gosine	NH/MA Regional Vice President

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1.0 INTRODUCTION

Wheelabrator Saugus Inc. (WSI) operates a 1,500 ton per day (TPD) waste-to-energy facility in Saugus, Massachusetts. The facility uses the heat released during the combustion of municipal solid waste (MSW) to produce steam, which powers a turbine/generator. The electricity created by the turbine/generator is then distributed to the grid for public use. As part of the thermal energy process, the facility utilizes a once through cooling system to condense the steam after it has made its way through the turbine. River water pumped from the adjacent Saugus River is used as the cooling medium for this cooling system and is discharged as non-contact cooling water (NCCW). WSI is authorized to discharge NCCW to the Saugus River by the United States Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (DEP) under federal National Pollution Discharge Elimination System (NPDES) Permit No. MA0028193 and Massachusetts Water Quality Certification. In accordance with Condition 1.C.2, of the NPDES permit, WSI was required to "assess the feasibility of operating down to a discharge rate of 38.9 MGD (million gallons per day)" and report its findings with the May 2011 DMR report. WSI completed this requirement and submitted its findings to the requisite agencies on June 15th, 2011. Due to the inconclusive findings of that report, WSI performed an additional feasibility study with the objective of coming to a more conclusive finding. This report details the findings of the latest feasibility study.

2.0 SUMMARY OF FINDINGS

With over four months of data and supporting analysis, WSI concludes that it is not feasible to operate the facility at a NCCW discharge flow rate of 38.9MGD while operating two boilers at full steam load. Steady state operation at this set point will cause the temperature difference of the intake and outlet water to exceed its permitted "Delta T" limit of 22°F[1]. This is the major limiting factor as determined by the results of this study. Additionally, it was found that due to the high intake river water temperatures in the month of May, the facility was required to reduce steam loads to comply with the maximum allowable discharge temperature of 90°F. The facility will continue to utilize and maintain the variable drive to curtail the cooling water flow rate to the extent practicable at full steam load operation, within the limits of the NPDES Permit (No. MA0028193).

During maintenance periods where only one boiler is operational, the study has determined that it is feasible for the facility to maintain full single boiler steam load while operating at 38.9MGD. While there are fewer sample points for single boiler operation than for the two boiler operation, this study proves that a flow of 38.9MGD is sufficient to maintain a steady turbine backpressure while one boiler is at full steam load. The delta T across the condenser can be maintained at a level below the permitted upper limit with this flow rate. Single boiler operation is infrequent and only occurs when one boiler is offline for either a scheduled or unplanned maintenance event (also referred to as an "outage").

While at the set point of 38.9MGD, WSI has found no short-term, mechanical problems with associated system components. The river water pumps have a manufacturer's maximum recommended turndown rate of 70%, and the set point of 38.9MGD correlates to a 68% turndown rate. The pumps were monitored for noise and vibration at this low setting (i.e. 68%), and no signs of unstable operation were observed. The scope of this study did not include an assessment of or prediction of long term mechanical issues potentially associated with operating below the recommended limits. Furthermore, the scope of this study did not include an assessment of the change in biological growth rate and the potential adverse affects on the cooling system.

Operation at 38.9 MGD is not feasible due to the inability to meet the 22°F delta T limit, and at some instances, the maximum allowable discharge temperature of 90°F during full steam load operation with two boilers in service.

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[1] It is noted that the permit limits for delta T (i.e., 22°F) and/or maximum discharge temperature (i.e., 90 °F) were not exceeded while conducting this study. Delta T is defined as the difference between the intake river water temperature and the discharge water temperature.

3.0 TESTING INFORMATION

This section details the testing methodology used during each phase of the study. It also presents the process indication improvements that were completed since the release of the 2011 Flow Management Study report and how that has affected WSI's ability to operate and monitor system performance. Lastly, this section details the progression of the testing execution through each month of the study.

3.1 Methodology

In order to arrive at a more conclusive result than the 2011 study, the WSI study team determined that only through empirical testing could total confidence in the results be achieved. In the previous study, detailed modelling was performed to predict hypothetical results. This system modelling resulted in conclusions with a high degree of uncertainty, mainly due in part to the design and age of the facility. To avoid any uncertainties, it was the decision of the project team to forego modelling and rely solely on empirical testing.

3.2 System Indication Improvements

Since the release of the 2011 Low Flow Feasibility Study, WSI has taken actions to improve the system indication components thereby allowing for a better collection of data and monitoring. See the following statement from the 2011 Flow Management Study:

> *"Based on the results drawn by the WSI testing team and its consultants, WSI concludes that the facility has an inadequate amount of process indications to justifiably determine that operating the pumps below the manufactures' recommended rate (equivalent of the 38.9 MGD discharge rate). If improvements to the process indication are made, WSI may be able to make a sound determination of feasibility at the reduced discharge rate.*
>
> *Process indications are measurements taken at all points within the total system of the facility. The current indications at the facility allow for the WSI staff to properly and proficiently operate the facility, but they lack the essential accuracy needed to draw the necessary conclusions of this study."*

This section describes each of the improvements and how it affected the outcome of results in this report.

3.2.1 Pressure Indication

Each of the river water pumps has a pressure gauge on its discharge side. This pressure indication verifies that the operating pump is producing enough pressure to drive the river water through the cooling water circuit and back into the river. Previously, the gauge could only be read by someone local to the pump, at the river water intake structure. During periodic rounds, operators would record the instantaneous pressure reading on the log sheet and use that as the sample data point for any calculations needed with this point.

The discharge pressure along with the tide level is used to calculate the total dynamic head (TDH) on the newly revised pump curve spreadsheet. The TDH is useful in determining the total flow of the river water through the pump. This determination is explained in Section 3.2.3.

Since the conclusion of the last study, WSI has installed transmitters on the gauges located on the discharge points of each pump. These transmitters relay the real-time pressure readings back to the control room and allow for a continuous monitoring of pump discharge pressure data. WSI operates the pumps with a single variable speed drive that can modulate the speed of the pump based on tide level, cooling water pipe fouling, steam load (cooling water demand) and permit limits. This constant change of flows directly affects the pump discharge pressure, and with only a periodic reading of the signal is it possible to fully determine the affects the change in flows has on the discharge pressures. Since the installation of these transmitters providing real time data, the operators can maintain continuous monitoring of the discharge pressure and use that data to determine the real-time flow based on the pump curve.

3.2.2 Pump/motor Speed Indication

Each of the river water pumps are run by vertically mounted 750HP electric motors. The pump/motor assembly is a direct coupling connection, located just above the pump in the river water intake structure. At this coupling, it is possible to measure the number of rotations of the coupling shaft and determine the pump speed.

Using newly replaced optical speed sensors and transmitters, operators are now able to monitor the real-time speed of each pump/motor. The speed of the motor is directly proportional to the flow through the pump and with this indication (and the TDH from Section 3.2.1) the operators can now determine the flow rate through the pump via the pump curve. Section 3.2.3 explains this concept in greater detail.

3.2.3 Pump Curve Spreadsheet

The performance of every pump, no matter what size or type, can be predicted by a pump curve, which describes the relationship between the speed of the pump, the total dynamic head (TDH) and the flow rate through the pump. When a pump is sized and manufactured, its specific pump curve is typically supplied by the manufacturer. The pump curve supplied is determined during the performance verification completed in the manufacturer's shop. A pump curve may be used to estimate the flow by correlating any given pump speed setting and TDH (TDH can be determined by measuring the discharge pressure and total vertical distance between the suction point of the pump and the highest absolute height the water travels). While this curve is essential to determining the feasible operation of the equipment and provides a reasonable method to determine flow, it is not as accurate as a flow meter.

As a way to improve operations and verify the river water flow rate, WSI hired a consultant during the summer of 2011 to generate a pump curve spreadsheet calculator. The objective was to create a tool in which operators could input the pump speed and TDH, and the spreadsheet would perform the calculations to output the flow rate through the pump. This spreadsheet has allowed operators to verify that the flow meter readings matched the indications from the pump curve[2]. Going forward, WSI plans to continually update this calculator as pump curves tend to shift based on maintenance cycles of the pump.

3.2.4 Process Improvement (PI) System

WSI recently updated its data management system by installing a Process Improvement (PI) System. The data used in this report was collected through the PI System. A useful benefit to this upgrade is the ability for users to manipulate and analyze data outside of the facility's control system. The previous method of using the facility's distributed control system (DCS) was cumbersome, prone to computer crashes, and antiquated. Having this new data acquisition tool not only improves the ability to remotely monitor system performance, but it also allows for the users to analyze long term trends while the operations staff focuses on the minute-to-minute operations[3].

PI was used to create a river water flow totalizer screen that determines how much river water had been pumped during a given day. The screen also estimates the projected total daily pump volume with the current flow rate. The PI tools have helped the WSI operators better understand the dynamics of the system and increase their ability to control the system parameters with the goal of curtailing the river water intake flow rate to the extent practicable.

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[2] The facility utilizes the pump curve as a means of reporting flow for when the flow meter is out of service. This spreadsheet calculator increases the operators' accuracy when using the pump curves.

[3] WSI determined that data collected using the PI system corresponds with the facility's DCS data with a very high degree of accuracy. For the purposes of this study, the PI data was been determined to be acceptable. It should be noted that all compliance related reports use data collected from the facility's DCS.

3.2.5 Intake River Water Flow Meter

On June 23, 2011, WSI retained a technician from True North to install and calibrate a McCrometer SPI (single point insertion) Mag flow meter. True North verified that the reported flow rates were accurate. This replacement has improved the reliability of the data collected for this study and the supporting conclusions.

Since the replacement of the flow meter and the generation of the pump curve spreadsheet calculator, good correlation has been observed between the two methods. WSI will continue to use both tools to verify intake river water flow rates to ensure the highest degree of data accuracy.

3.3 Testing Execution

This section provides narrative descriptions of each of the periods of testing during this study. For complete data analysis see section 4.0 DATA ANALYSIS.

3.3.1 Late 2011

During the fourth quarter of 2011, WSI experienced numerous maintenance issues related to boiler performance. Between October to December of 2011, both boilers were offline for unscheduled maintenance for a combined total of fourteen (14) times. During this period, boiler loads were curtailed to further reduce the number of unscheduled maintenance outages.

Given the operational conditions during this timeframe, the data collected does not represent the full steam load operation of the facility and therefore could not be used in the feasibility analysis.

3.3.2 January 2012

From January 1st to January 29th, scheduled maintenance activities were performed at the facility. Beginning in early January, WSI took one boiler offline for a two week scheduled maintenance outage. After the first boiler was cleaned and returned to service, the second boiler was taken offline for similar repairs. Therefore, during most of January, data for two boiler operation at full steam load was not collected; however portions of the recorded data for one boiler operation were used in this study.

3.3.3 February 2012

Following the January maintenance outage, the facility operated at full steam load (with the exception of 36 hours downtime due to an unscheduled maintenance outage) for the entire month of February (696 hours total). During this month the operators curtailed intake river water flows and monitored performance to maintain a Delta T at 20.5^{o}F.

3.3.4 March 2012

During the month of March, the facility experienced no unscheduled downtime. Periods of reduced loads were experienced intermittently, however this is common when combusting MSW. In general, the data gathered during the month of March provided a bountiful amount of operational data. As the operators became more comfortable with the new PI tools and monitoring system, they were able to increase the operational Delta T set point to 21.5^{o}F. Also noted during this time, the intake river water temperature averages and extremes were above average for this time of year. This analysis is discussed section 4.0 DATA ANALYSIS.

3.3.5 April 2012

During the month of April, the facility experienced 29 hours of unscheduled downtime. The operators were able to attain a set point of the Delta T limit of near 22^{o}F. This had never been achievable at the facility for a long term period. Also similar to March, the river water intake temperatures were above average for April. For one instance, this caused operations to limit its steam production to maintain compliance with the absolute discharge temperature limit of 90^{o}F. This analysis is discussed in detail in section 4.0 DATA ANALYSIS.

3.3.6 May 2012

During the month of May, the facility experienced 426 hours of unscheduled and scheduled downtime out of a possible 744 operating hours in the month. Accordingly, the number of sampling points for this study was reduced in May. Due to the outages and downtime, one boiler operational data became available and is used in this report. While the WSI operators continued to attempt to maintain the highest possible Delta T set point, they found that the upper limit of the discharge temperature (90^{o}F) was the limiting factor in May as the intake temperature increased due to seasonal affects. It is noted that the average intake temperature was greater than the historical average for the month of May.

4.0 DATA ANALYSIS

This section of the report presents and explains the assumptions used to filter the data. Data filtering is essential to ensure that the feasibility analysis is conducted on the full steam load conditions. Additionally in this section, correlations and trends are generated from the filtered data. Subsequent analysis is followed to explain the cause and affects of correlations and trends.

WSI measures and operates its river water intake flow rate in units of thousand gallons per minute (kGPM). For compliance with the NPDES permit, WSI reports its river water intake use in units of million gallons per day (MGD). This report uses both unit systems interchangeably. Table 1 has been provided for reader clarity to correlate the respective flow rates between the different units.

kGPM	MGD
33.0	47.5
32.5	46.8
32.0	46.1
31.5	45.4
30.0	43.2
29.5	42.5
29.0	41.8
28.5	41.0
28.0	40.3
27.5	39.6
27.0	38.9
26.5	38.2
26.0	37.4
25.5	36.7
25.0	36.0

Table 1 - River water intake flow rates presented in thousand gallons per day (kGPM) and their equivalent equal in million gallons per day unit (MGD)

4.1 Data Filters and Assumptions

This subsection defines each of assumptions used to filter the data. The combination of these filters produces a volume of data that best represents the full steam load operation of the facility given defined scenarios[4]. Data that did not conform to the filter was omitted from the analysis, given the defined scenarios.

[4] Only two main scenarios were considered: (1) two boiler operation with both boilers at full steam load, and (2) single boiler operation with boiler at full steam load.

4.1.1 Steam Load

During two boiler operation, the set point at full steam load for the total steam entering the turbine is 310,000 lbs of steam per hour at a constant pressure of 650psi and constant temperature of 850^{o}F. Assuming that both boilers produce the same amount of steam, since they are of similar design and operation, each boiler would produce 155,000 lbs of steam per hour. However due to a large number of possible variations in operations (e.g., BTU value of the incoming MSW) operating at the given set point is not always realistic. Therefore, for the purposes of this study, the full steam load with two boilers operational is defined as any total steam rate greater than 290,000 lbs of steam per hour.

During single boiler operation, for the purposes of this study, the associated full steam load is defined as any steam rate between 135,000 lbs of steam per hour to 160,000 lbs of steam per hour. The upper limit of steam load for one boiler is capped based on boiler design. For the WSI boilers, this limit is approximately 155,000 lbs of steam per hour, with the ability to reach 160,000 lbs of steam per for only short durations. For this reason, the range of the single boiler operation is capped.

The range from 160,000 to 290,000 lbs of steam per hour represent either one boiler is at full steam load and the other at partial load, or a combination both boilers at partial steam load. This occurs mainly before and after maintenance outages when one boiler is being brought back online for service. These periods are intermittent and do not represent the full steam load operating conditions and have therefore been omitted from the analysis.

4.1.2 Cooling Water Flow Rate

The intake river water flow rate is measured using an in-line, insertion flow meter. For the majority of the time, this flow meter transmits an accurate single. However, it should be noted that inherent to electronic transmission devices, spurious data (i.e., non representative high or low values) can be transmitted. When this occurs, which is infrequent and only for a second, it is filtered from the analyzed data. For this reason the cooling water flow rate data is filtered from 36.0 to 47.5 MGD.

It is noted that for NPDES compliance reporting purposes, all false data that may potentially be recorded, is investigated and proven prior to reporting. When this occurs on the intake river water flow meter, operators evaluate TDH and pump speed, and utilize pump curves to estimate the actual flow rate.

4.1.3 Delta T (Temperature)

WSI has observed 15^{o}F temperature swings within a single hour. This phenomenon usually occurs during the transition between low slack tide and incoming tide, and in the presence of direct sunlight. WSI has observed that the stagnant water that lies on top of the mud flats increases in temperature dramatically, and then once the tide turns, that water is pulled in as the intake cooling water. The range for filtering is +/- 15^{o}F with respect to adjacent readings, based on the stated observation.

4.2 Correlations and Trends

Given the time span and amount of data collected for this study, many correlations can be generated. This subsection presents the strongest correlations and trends to be taken from the analysis of the given data, regarding determination of the feasibility of achieving the low flow set point of 38.9MGD. It should be noted that some of the trends (those versus time) have periods of no data, which are extrapolated and depicted with the connecting line for visual purposes. This data was omitted by the filters as described in Section 4.1 Data Filters and Assumptions.

4.2.1 Two Boiler Operation

With regards to the objective of this feasibility study, the analysis of data while operating the two boilers at full steam load is the most critical. This represents the normal operating state of the plant. The following graphs and trends present important correlations needed to support the study's results.

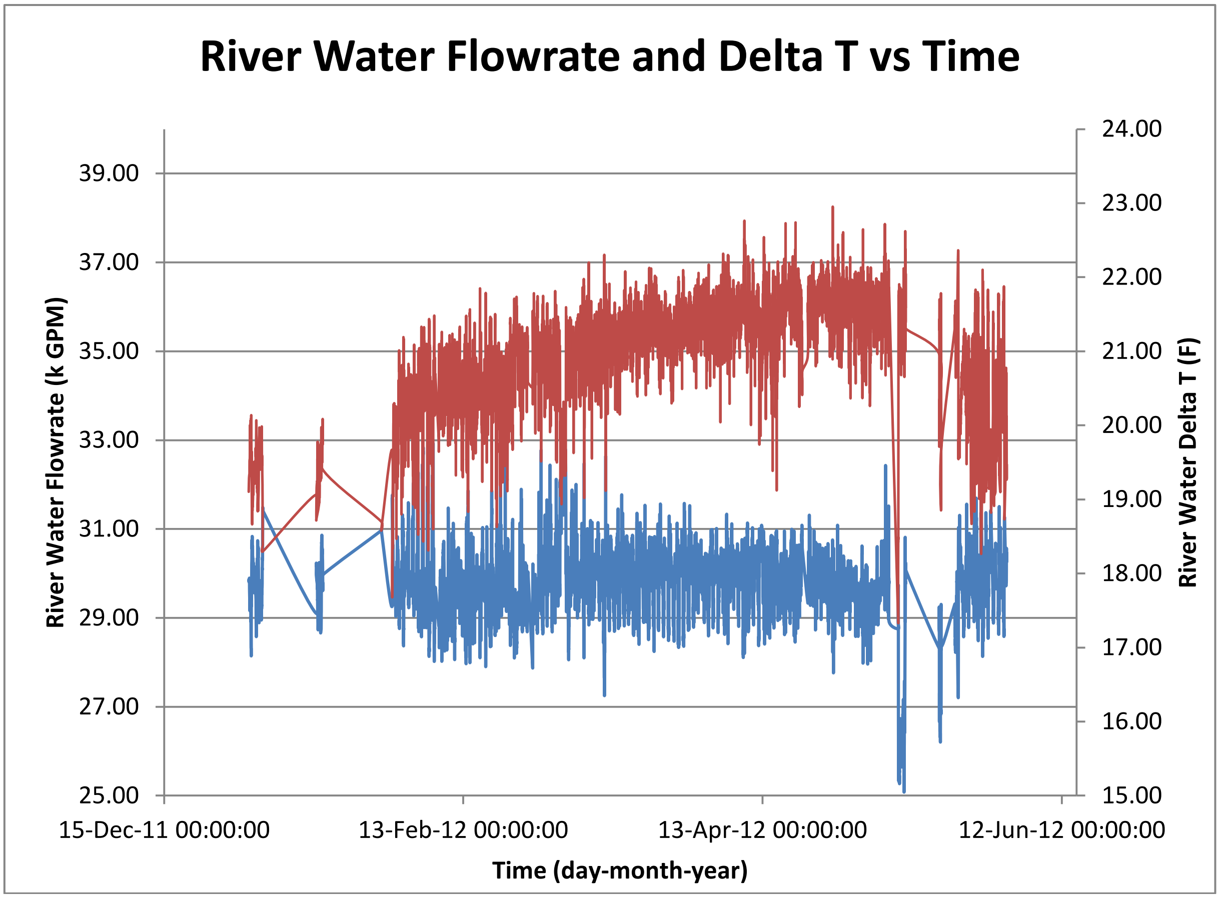

Figure 1 - River Water Flow Rate (blue – values at left axis) and Delta T (red – values at right axis) vs Time

Figure 1 presents the river water flow rate and the Delta T difference over the period of the study testing. This figure depicts that, over time, the WSI operations staff continued to improve the ability to operate successfully at full steam load while maintaining the highest achievable Delta T, without surpassing the permitted hourly limit. The resulting flow rate is shown in blue and it can be seen that the majority of the corresponding flow rates are between 30kGPM and 29kGPM, or 43.2 and 41.8MGD, respectively.

During May there was a small period around the maintenance outage where WSI had a curtailed flow rate below 27kGPM. However, this data is misleading as the maintenance outage activities caused these results. It was for only a short time and not sustainable.

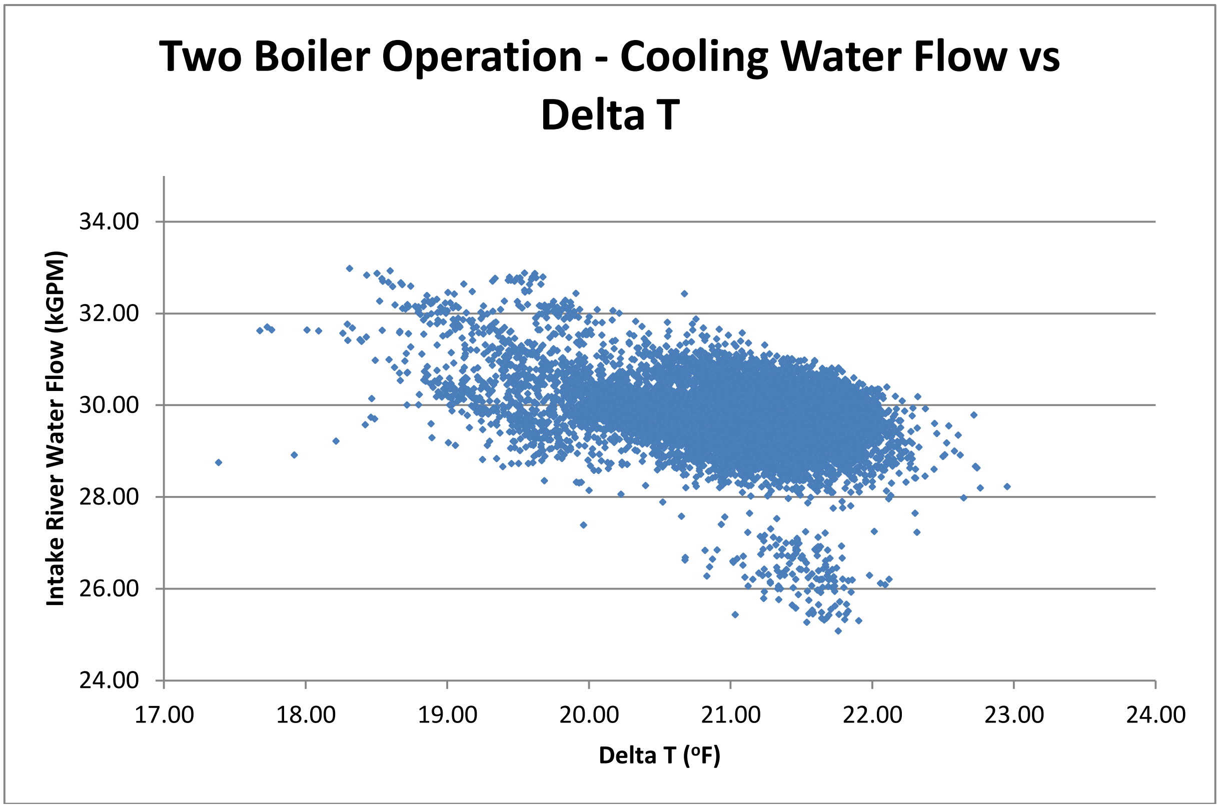

Figure 2 - Cooing Water Flow vs Delta T for Two Boiler Operation

In Figure 2, the correlation between the Delta T and the cooling water flow is depicted. As the Delta T approaches the 22°F mark, the resulting flow rate reduces to 28kGPM and 30kGPM.

It should be noted that there are multiple points in which the operators had Delta T readings of greater than 22°F. However these are only single points representing a 15minute block, and not an entire hour. WSI has remained in compliance with all of the current NPDES permit limitations throughout the term this study.

There is a small about of data points in Figure 2 where the river water flow rate is below 28kGPM and the temperature between 21 to 22°F. These points can be attributed to the close proximity to the scheduled outage in May. They do not represent the steady state operation of two boiler operation at full steam load as operations was preparing for or coming out of an outage at this time.

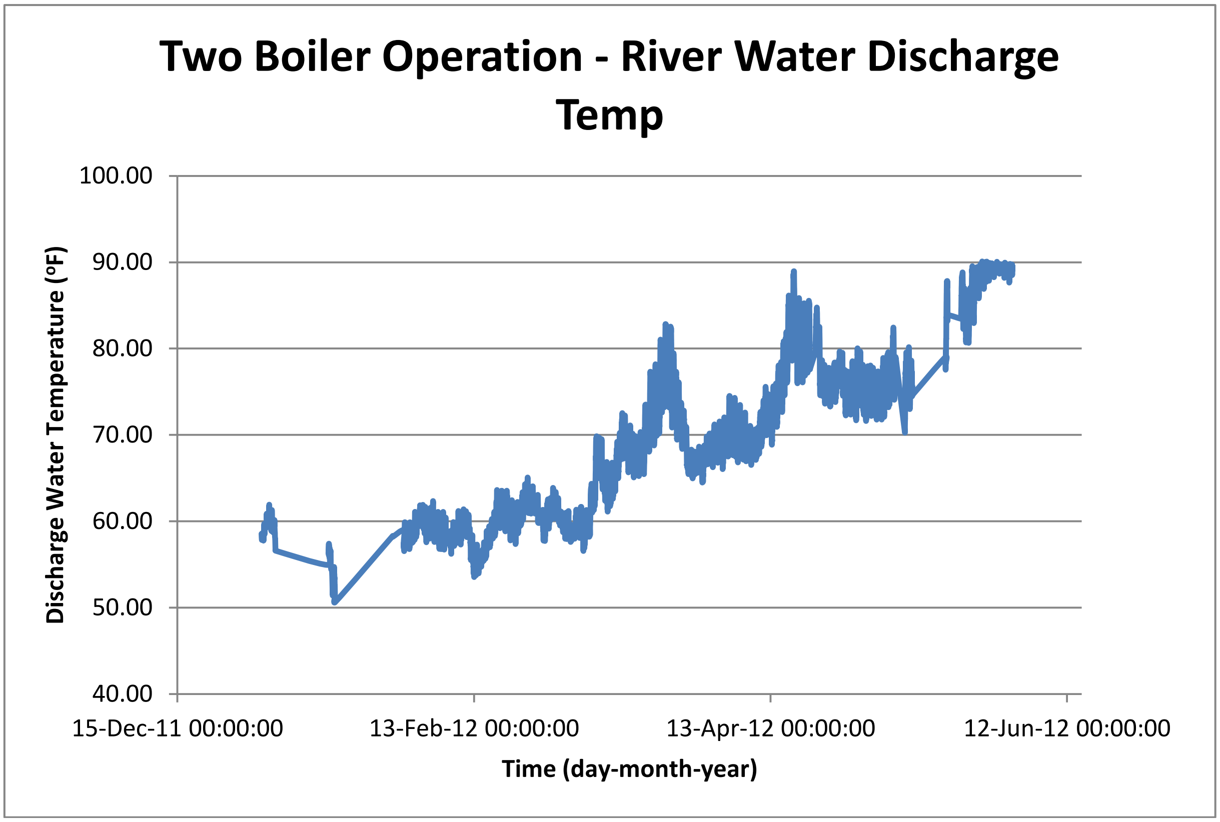

Figure 3 - Discharge Water Temperature vs Time during Two Boiler Operation

For a majority of the testing period, until late May, the upper permitted discharge temperature limit of 90°F was not a factor in plant operation. Figure 3 depicts the discharge temperature over the testing period, and in late May, WSI was operating up to the extent possible of the 90°F point.

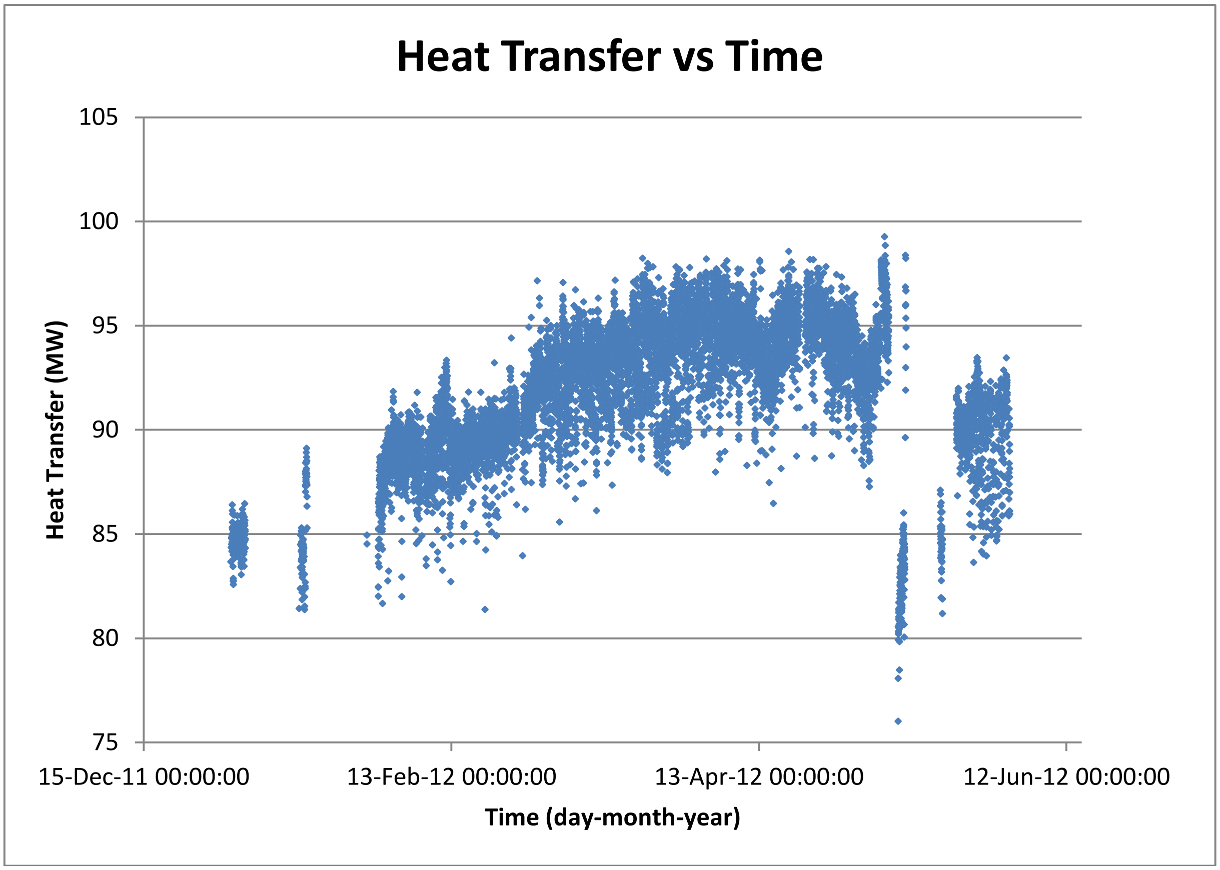

Figure 4 - Heat Transfer vs Time for Two Boiler Operation

Another important correlation derived from the data is the change in heat transfer of the cooling water to the condenser over time. As WSI progressed through late winter into spring, the heat transfer steadily increased. This is due to the seasonal increase of the intake river water temperature, incremental increase in the Delta T, and increased fouling of the condenser.

Each year (typically in May), the condenser is taken off-line and cleaned. As WSI returned to service following the May 2012 outage, the heat transfer was noticeably less showing the affects of a successful condenser cleaning; however, it should also be considered that in late May the discharge temperature was nearing 90°F, which limited the total heat transfer.

Biological growth inside the river water intake lines and the condenser cause fouling of the equipment. This fouling restricts water flow and decreases the ability for the equipment to efficiently transfer heat. It has been observed that after these lines are cleaned, the system operates more efficiently.

4.2.2 One Boiler Operation

Although considerably fewer data points are available for single boiler operation, the study did consider the feasibility of operating one boiler at full steam load for the given intake river water flow rate of 38.9MGD.

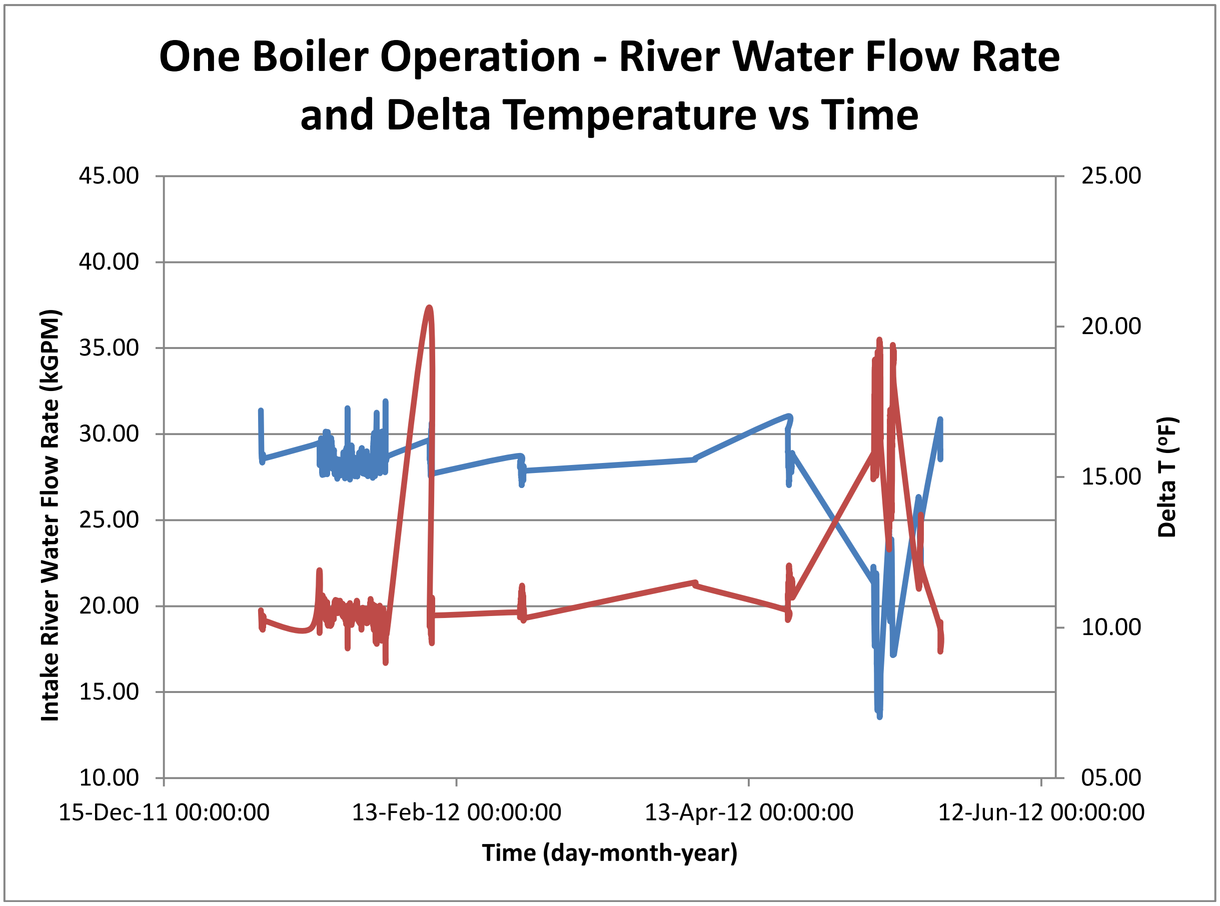

Figure 5 - River Water Flow Rate (blue) and Delta T (red) vs Time for One Boiler Operation

During the periods of one boiler operation, mainly in January and May, the river water flow rate is much less than for a two boiler operation, this is seen in Figure 5. During January, operators maintained the intake flow rate to approximately 41.0MGD. In May, the operators held the river water flow rate to a level below 38.9MGD. The resulting Delta T was between 15 to 20^{o}F for the month of May.

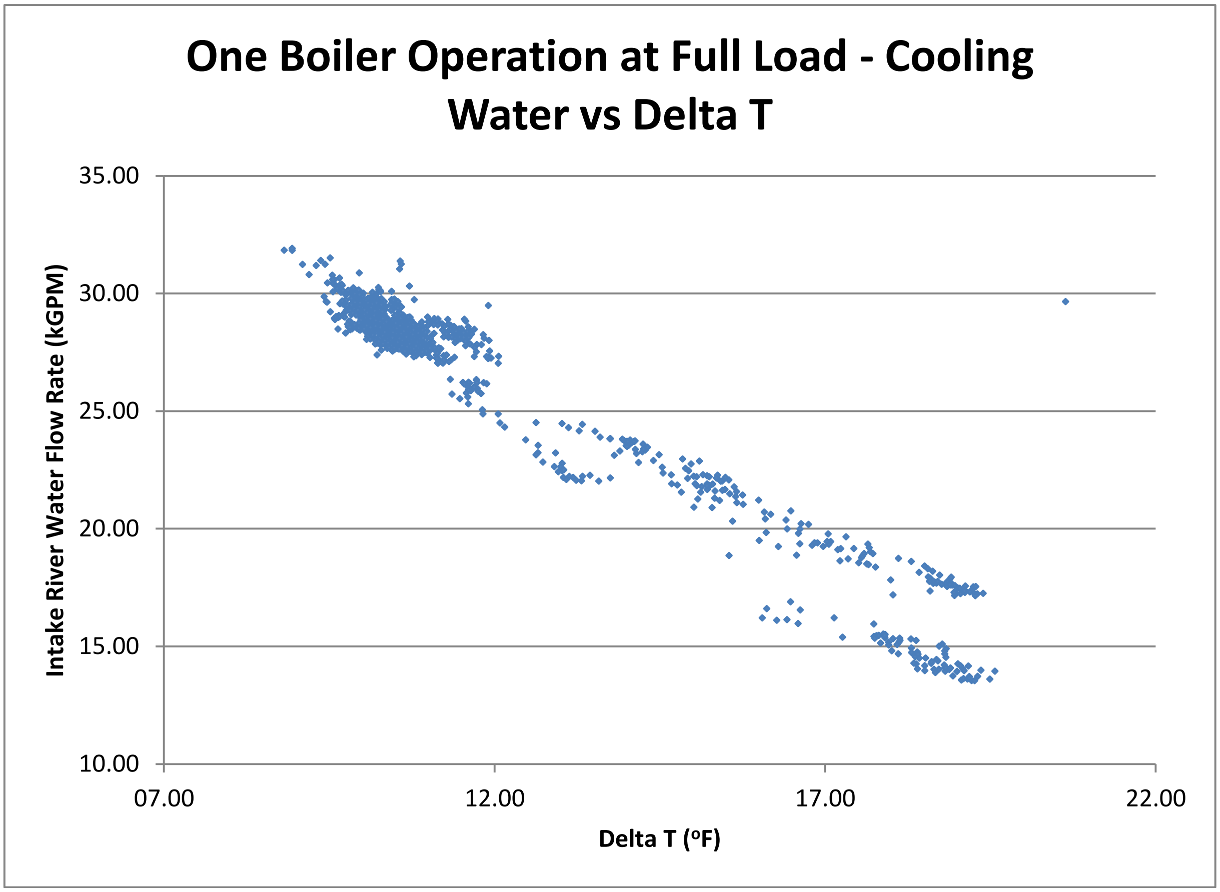

Figure 6 - Cooling Water Flow vs Delta T for One Boiler Operation

Figure 6 depicts the direct correlation between the river water flow rate and the Delta T during one boiler operation. It can be seen that as the operators reduce the cooling water flow, the Delta T approaches the 22°F point.

4.2.3 General Parameters

Regardless of one or two boiler operations, the intake river water temperature sets the thermal boundaries for the amount of allowable heat transfer through the system.

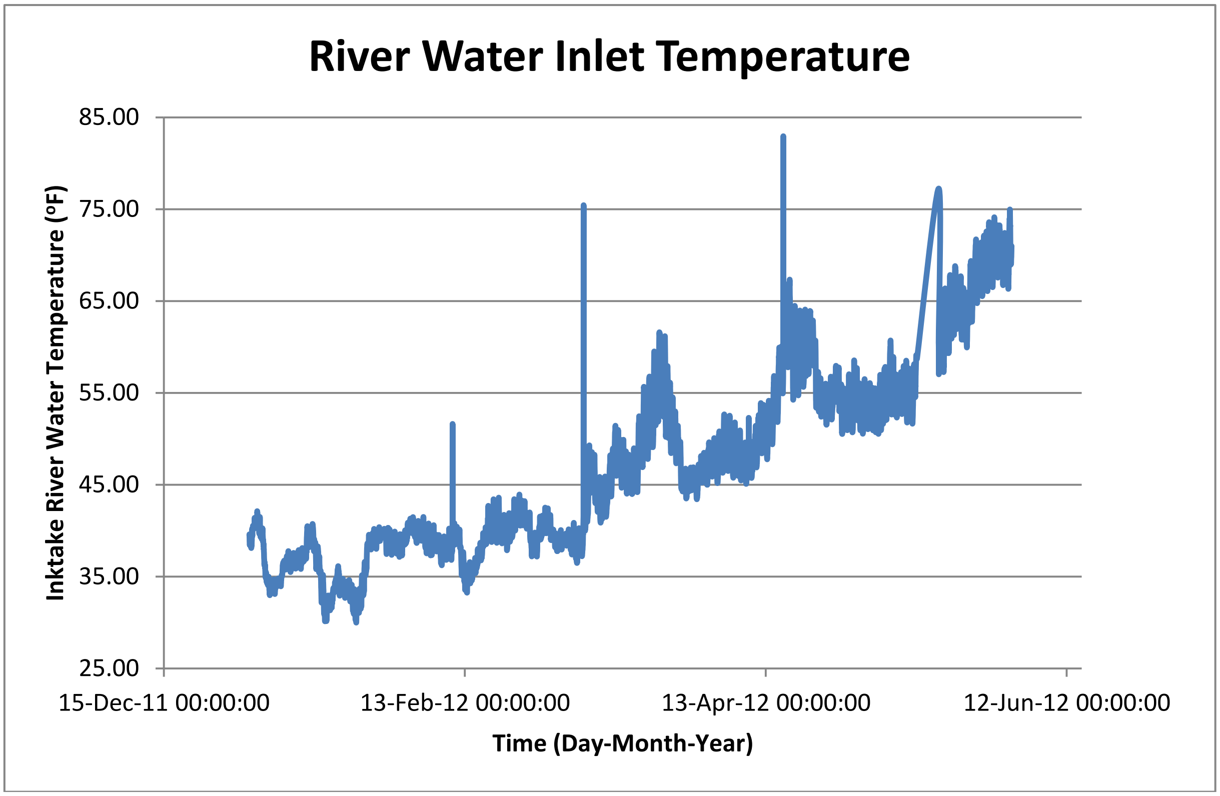

Figure 7 - Intake River Water Temperature vs Time

The most significant driver for the allowable heat transfer is the intake river water temperature. In general, the greater the temperature difference between the two mediums in a heat exchanger (steam and river water in this case) the more efficient the heat transfer process. As the river water temperature increases due to seasonal influences, the less efficient the condenser becomes at condensing the steam as it exits the turbine. Figure 7 depicts the intake river water temperature from Jan to May of 2012.

The spikes that are seen on Figure 7 depict the phenomenon that was discussed in Section 4.1.3. These 15°F swings can be attributed to the low tide influence on the intake river water, on hot days when the sun has the ability to heat the low tide water the greatest. These swings only last for a small period of time when that initial high temperature water is introduced into the cooling water system.

5.0 RESULTS AND CONCLUSIONS

This section communicates the results as determined by the data analysis for the feasibility study. From the results conclusions are drawn and expressed.

5.1 Low Flow Feasibility

Based on the data generated during this study period, the correlation between the river water flow rate and the resulting intake/discharge temperature is the critical determination of the feasibility. Figure 2 from subsection 4.2.1 depicts that as the flow rate of the intake river water is decreased, the Delta T limit inversely increases. This factor becomes limiting when the Delta T reaches the permitted limit of 22^{o}F. The flow range at this point is between 30.3 and 28.5 (kGPM). This range represents the lowest attainable flow rate with a Delta T of 22^{o}F across the intake and discharge structures. Therefore it is not feasible to operate two boilers at full steam load and maintain an intake river water flow rate of 38.9MGD.

When considering only one boiler operation at full steam load, Figure 6 depicts that the desired flow rate of 38.9MGD is possible with a resulting Delta T of less than 22^{o}F. It should be noted that if the intake river water temperature does surpass approximately 70^{o}F, the operators may need to increase the intake river water flow rate during one boiler operation to avoid the discharge temperature exceeding 90^{o}F. This condition was not experienced during the study testing, but it is possible during the either October or May when temperatures are unseasonably high.

5.2 Comparison to Results of Past Study

The findings of the 2011 Flow Management Study are further confirmed by the most recently performed feasibility study. Given the process improvements, indications and tools, WSI has determined conclusively that is not feasible to operate at full steam load with an intake river water flow rate of 38.9MGD. However, WSI will continue to monitor and improve its operations to curtail the intake pumping of the river water to the extent practicable.

It was noted in the past study that when the intake water flow rate is set to 27,000 GPM, the velocity through the condenser tubes is 4.58 feet per sec. The condenser manufacturer’s recommended lowest velocity is 3.5 feet per second. Any flow that results in velocities less than the manufacturers recommended velocity will likely cause an uneven cooling in the condenser, which would be detrimental to operations. It was also noted that lower flows tend to worsen biological macro and micro fouling rates of the condenser, which result in less efficient operations. The magnitude of the effect of the lower flow on cleanliness is highly site-specific, and can only be quantified through empirical performance testing. Figure 4 depicted the affects of cleaning and showed how fouling over time affects the heat transfer through the condenser.

According to Flowserve pump curves, the efficiency at 28,000 GPM is 80%, while the efficiency at 27,000 GPM is 78%. The manufacturer's recommend turndown rate is 70%, while the low flow setting correlates to a turndown rate of 68%. Through this recent study, it was proven that the mechanical operation of these pumps at this rate was not ill-affected for short term operation at a lower pump speed. It should be noted that the scope of this study did not consider the long term operation of the pumps at this setting.

5.3 Conclusions

From the results presented earlier in this section, the main conclusion drawn is that it is not feasible for WSI to operate the facility with the two boilers at full steam load while maintaining an intake river water flow rate of 38.9MGD. When conducting this study, WSI found that the NPDES permit limit for the Delta T (22^{o}F) was the main limiting factor. It was also seen that during the month of May certain days had the river temperatures above 65^{o}F causing operators to reduce the steam loads in order to comply with the NPDES max temperature permit limit of 90^{o}F. Without changes to these limits, it is not feasible for WSI to operate at the low flow set point established in this feasibility study. It can be hypothesized that with a larger Delta T limit, the flow rate could be reduced further. Without empirical evidence to determine the extent of this reduction, it is not possible to speculate.

When considering the situation when only one boiler is in service and at full load, it is feasible for WSI to operate while maintaining the intake river water flow rate of 38.9MGD. WSI will continue to curtail the flow rate of the intake river water to the extent practicable, under all feasible conditions.

Ryan Tebbetts, Engineer in Training, LEED Green Associate
Wheelabrator Project Engineer

LEED GREEN ASSOCIATE